

AMENDMENTS TO THE CLAIMS

1. (Original): A burner assembly comprising:

a venturi cluster including at least two venturis, each said venturi having a main venturi body portion defining a burner conduit, a venturi inlet and a venturi outlet, each said venturi being arranged and adapted for (1) inducing a flow of air when a gaseous fuel is introduced into said inlet and allowed to pass through said conduit, (2) creating an ultra fuel lean mixture of said air and said fuel, and (3) discharging an ultra fuel lean mixture of air and fuel from its said outlet;

a collector having an inlet end that is connected to and arranged in fluid communication with the outlets of said venturis, whereby the respective ultra fuel lean mixtures of air and fuel discharged from said outlets are collected and intermixed to present a single ultra fuel lean mixed stream of air and fuel; and

a burner tip attached to and in fluid communication with an outlet end of said collector, said tip being adapted and arranged for receiving said single ultra fuel lean mixed stream of air and fuel from said collector and directing the same into a combustion zone.

2. (Original): A burner assembly as set forth in claim 1, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally radial direction relative to a longitudinal axis of said tip.

3. (Original): A burner assembly as set forth in claim 2, wherein said tip is adapted and arranged to create a round flat flame which surrounds said tip.

4. (Original): A burner assembly as set forth in claim 1, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally axial direction relative to a longitudinal axis of said tip.

5. (Original): A burner assembly as set forth in claim 4, wherein said tip is adapted and arranged to create a cylindrical flame which extends along said axis.

6. (Original): A burner assembly as set forth in claim 1, wherein said cluster includes at least three of said venturis.

7. (Original): A burner assembly as set forth in claim 6, wherein said cluster includes at least six of said venturis.

8. (Original): A burner assembly as set forth in claim 1, wherein the inlet end of each venturi is bell shaped.

9. (Original): A burner assembly as set forth in claim 8, wherein said tubes include straight portions that are arranged in substantial parallelism relative to one another.

10. (Original): A burner assembly as set forth in claim 6, wherein the inlet end of each venturi is bell shaped.

11. (Original): A burner assembly as set forth in claim 10, wherein said tubes include straight portions that are arranged in substantial parallelism relative to one another.

12. (Original): A burner assembly as set forth in claim 7, wherein the inlet end of each venturi is bell shaped.

13. (Original): A burner assembly as set forth in claim 12, wherein said tubes include straight portions that are arranged in substantial parallelism relative to one another.

14. (Original): A burner assembly as set forth in claim 1, wherein said venturis have essentially the same physical capacity.

15. (Original): A burner assembly as set forth in claim 1, wherein at least one of said venturis has a different physical capacity than another of said venturis.

16. (Original): A burner assembly as set forth in claim 6, wherein at least one of said venturis has a different physical capacity than another of said venturis.

17. (Original): A burner assembly as set forth in claim 7, wherein said venturis have essentially the same physical capacity.

18. (Original): A burner assembly as set forth in claim 7, wherein at least one of said venturis has a different physical capacity than another of said venturis.

19. (Original): A burner assembly as set forth in claim 1, wherein said collector is elongated and includes a central axis which extends between said ends thereof.

20. (Original): A burner assembly as set forth in claim 19, comprising a central fuel tube that extends through said collector along said axis.

21. (Original): A burner assembly as set forth in claim 20, wherein the inlet end of the collector includes a least two open segments and the outlets of the venturis are each connected in fluid communication with a respective segment.

22. (Original): A burner assembly as set forth in claim 6, wherein said collector is elongated and includes a central axis which extends between said ends thereof.

23. (Original): A burner assembly as set forth in claim 22, comprising a central fuel tube that extends through said collector along said axis.

24. (Original): A burner assembly as set forth in claim 23, wherein the inlet end of the collector includes a least three open segments and the outlets of the venturis are each connected in fluid communication with a respective segment, said segments being arranged in a series extending around said central fuel tube.

25. (Original): A burner assembly as set forth in claim 7, wherein said collector is elongated and includes a central axis which extends between said ends thereof.

26. (Original): A burner assembly as set forth in claim 25, comprising a central fuel tube that extends through said collector along said axis.

27. (Original): A burner assembly as set forth in claim 26, wherein the inlet end of the collector includes a least six open segments and the outlets of the venturis are each connected in fluid communication with a respective segment, said segments being arranged in a series extending around said central fuel tube.

28. (Original): A burner assembly as set forth in claim 21, wherein said central fuel tube extends through said burner tip and has a downstream end portion which projects through a centrally located opening at a downstream end of the burner tip.

29. (Original): A burner assembly as set forth in claim 28, wherein is included a fuel nozzle at the downstream end portion of the central fuel tube.

30. (Original): A burner assembly as set forth in claim 24, wherein said central fuel tube extends through said burner tip and has a downstream end portion which projects through a centrally located opening at a downstream end of the burner tip.

31. (Original): A burner assembly as set forth in claim 30, wherein is included a fuel nozzle at the downstream end portion of the central fuel tube.

32. (Original): A burner assembly as set forth in claim 27, wherein said central fuel tube extends through said burner tip and has a downstream end portion which projects through a centrally located opening at a downstream end of the burner tip.

33. (Original): A burner assembly as set forth in claim 32, wherein is included a fuel nozzle at the downstream end portion of the central fuel tube.

34. (Original): A burner assembly as set forth in claim 28, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally radial direction relative to a longitudinal axis of said tip.

35. (Original): A burner assembly as set forth in claim 34, wherein said tip is adapted and arranged to create a round flat flame which surrounds said tip.

36. (Original): A burner assembly as set forth in claim 28, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally axial direction relative to a longitudinal axis of said tip.

37. (Original): A burner assembly as set forth in claim 36, wherein said tip is adapted and arranged to create a cylindrical flame which extends along said axis.

38. (Original): A burner assembly as set forth in claim 30, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally radial direction relative to a longitudinal axis of said tip.

39. (Original): A burner assembly as set forth in claim 38, wherein said tip is adapted and arranged to create a round flat flame which surrounds said tip.

40. (Original): A burner assembly as set forth in claim 30, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally axial direction relative to a longitudinal axis of said tip.

41. (Original): A burner assembly as set forth in claim 40, wherein said tip is adapted and arranged to create a cylindrical flame which extends along said axis.

42. (Original): A burner assembly as set forth in claim 32, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally radial direction relative to a longitudinal axis of said tip.

43. (Original): A burner assembly as set forth in claim 42, wherein said tip is adapted and arranged to create a round flat flame which surrounds said tip.

44. (Original): A burner assembly as set forth in claim 32, wherein said tip is elongated and adapted and arranged for directing said single ultra fuel lean mixed stream out of said tip and into said zone in a generally axial direction relative to a longitudinal axis of said tip.

45. (Original): A burner assembly as set forth in claim 44, wherein said tip is adapted and arranged to create a cylindrical flame which extends along said axis.

46. (Original): A burner assembly as set forth in claim 35, wherein said fuel nozzle is adapted and arranged for providing secondary fuel to said combustion zone.

47. (Original): A burner assembly as set forth in claim 39, wherein said fuel nozzle is adapted and arranged for providing secondary fuel to said combustion zone.

48. (Original): A burner assembly as set forth in claim 43, wherein said fuel nozzle is adapted and arranged for providing secondary fuel to said combustion zone.

49. (Original): A burner assembly as set forth in claim 37, wherein said fuel nozzle is adapted and arranged to provide a continuous flame at a location in the zone which is spaced axially from said downstream end of the tip.

50. (Original): A burner assembly as set forth in claim 49, wherein said location is spaced far enough from said downstream end in said zone such that the velocity of the single mixed stream directed out of the tip into the proximity of the fuel nozzle is no greater than a flame sustaining velocity.

51. (Original): A burner assembly as set forth in claim 41, wherein said fuel nozzle is adapted and arranged to provide a continuous flame at a location in the zone which is spaced axially from said downstream end of the tip.

52. (Original): A burner assembly as set forth in claim 51, wherein said location is spaced far enough from said downstream end in said zone such that the velocity of the single mixed stream directed out of the tip into the proximity of the fuel nozzle is no greater than a flame sustaining velocity.

53. (Original): A burner assembly as set forth in claim 45, wherein said fuel nozzle is adapted and arranged to provide a continuous flame at a location in the zone which is spaced axially from said downstream end of the tip.

54. (Original): A burner assembly as set forth in claim 53, wherein said location is spaced far enough from said downstream end in said zone such that the velocity of the single mixed stream directed out of the tip into the proximity of the fuel nozzle is no greater than a flame sustaining velocity.

Claims 55 through 105 (Cancelled):

106. (New): A burner assembly as set forth in claim 1, wherein the cluster and the collector are adapted and arranged such that said ultra fuel lean mixed stream includes all of the combustion air needed to support combustion of fuel in said zone.

107. (New): A burner assembly as set forth in claim 1, wherein the cluster and the collector are adapted and arranged such that said ultra fuel lean mixed stream includes no more than about 55% of the total fuel to be combusted in said zone.

108. (New): A burner assembly as set forth in claim 106, wherein the cluster and the collector are adapted and arranged such that said ultra fuel lean mixed stream includes no more than about 55% of the total fuel to be combusted in said zone.